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(54) Safety Clips for Harnesses

(57) A safety clip for a harness, e.g. for yachtsmen or mountaineers, having a gate member (12) pivoted on a body member (10) against return spring pressure, is provided with a ferrule (14) carrying an extended locking portion (16), rotatable against spring pressure from the locking position shown to a position in which the gate

member can be opened inwards, the required rotation of the ferrule being substantially less than one quarter turn.

Co-operating formations on the locking portion (16) and the body member (10) cause the ferrule to be rotated out of the locking position as the gate member (12) is returned to the closed position, whereupon the ferrule springs back to the locking position.

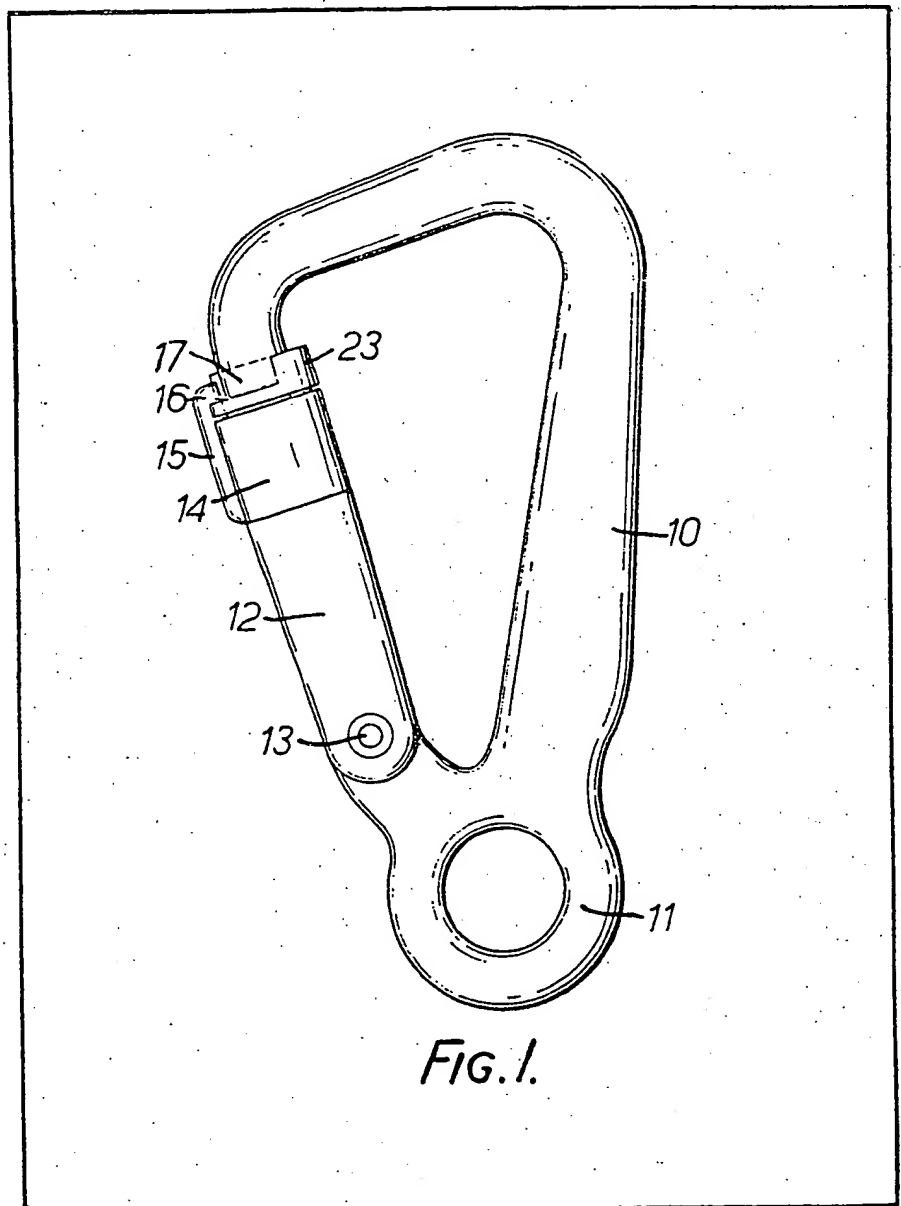


FIG. 1.

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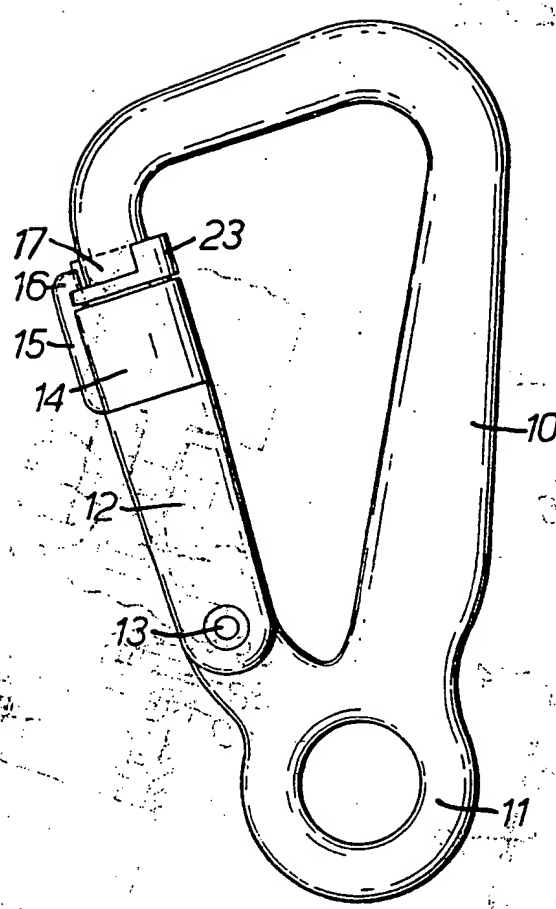


FIG. 1.

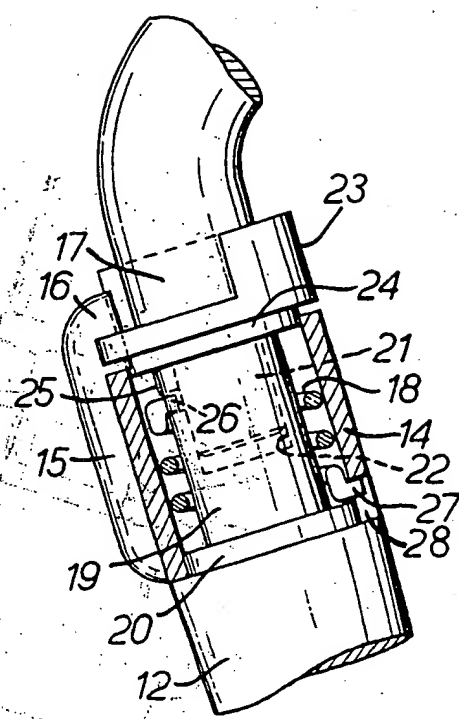


FIG. 2.

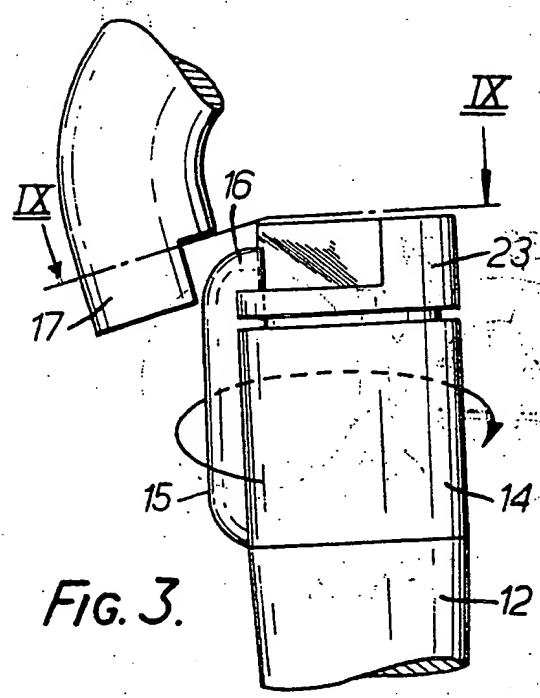


FIG. 3.

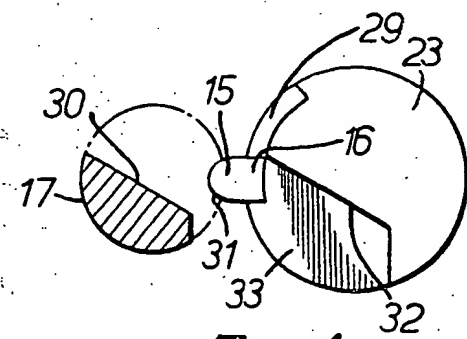


FIG. 4.

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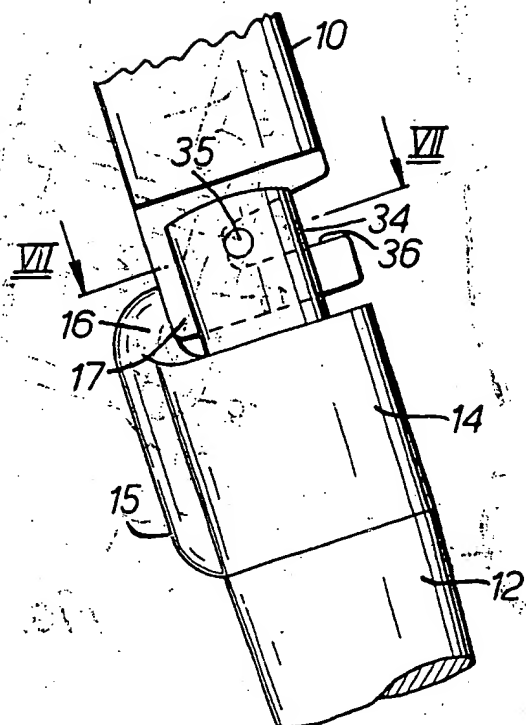


FIG. 5.

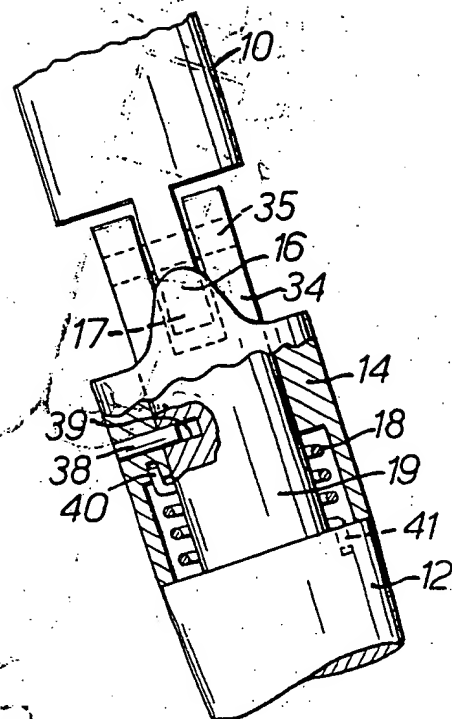


FIG. 6.

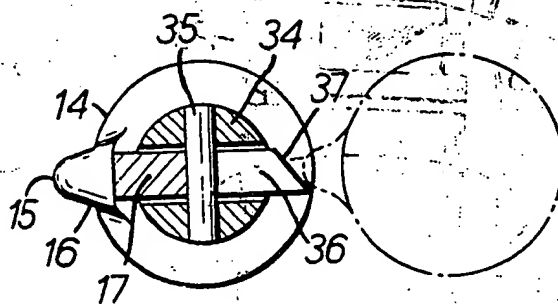


FIG. 7.

## SPECIFICATION

## Safety Clips for Harnesses

This invention relates to safety clips for harnesses, such as are used in safety equipment for yachtsmen and mountaineers.

Spring-action clips have been used for such purposes, comprising a body member and a gate member pivoted on the body member for movement against spring pressure from a closed position in which the two members form a closed loop to an open position in which an opening is made to allow a harness element, such as a shackle on a life line, to be introduced into or removed from the loop. The gate member can conveniently be opened by thumb pressure when the clip is held in the hand. In practice, in certain unusual circumstances, it has been found that the gate member can become accidentally opened so that the harness member is released. Even a slight risk of such accidental opening is obviously unacceptable in a safety clip. It has therefore been proposed to provide a locking ferrule screw-threaded on the end of the gate member, which can be screwed up to surround and engage the adjacent end of the body member when the clip is closed, but this arrangement is too slow and awkward in operation to be generally acceptable in situations demanding quick action.

A clip has been described in British Patent Specification No. 1,065,231 in which the gate member or latch carries a locking piece or sleeve having a longitudinally extended locking portion or tongue of the same diameter as the sleeve. The sleeve is mounted on the gate member so as to be rotatable against the pressure of a spring disposed between them, from a locking position in which the tongue prevents opening of the gate member to a position in which it permits such opening. The sleeve requires to be turned through about 180° to bring the tongue into position to permit opening, at which position a slot provided in the sleeve at its end adjacent to the hinge can engage around a lug portion on the body member as the gate member is opened, so as to hold the sleeve in the turned position so long as the gate member is open; the slot disengages from the lug portion when the gate member is closed again so as to allow the sleeve to be rotated by the spring back to the locking position. In another clip described in Patent Specification 1,065,231, the sleeve has to be turned through 90° to release the gate member. In this case, the extended locking portion or tongue on the sleeve is replaced by a diametral slot engaging with a Tee-shaped end portion on the body portion or shank of the clip, the end of the sleeve adjacent to the hinge having a slot engaging a lug portion as before to hold the sleeve in the 90° turned position until the gate member is closed again. Specification 1,065,231 recommends that the locking device should be constructed so that the locking piece has to be turned through at least 90° from its operative position before the latch can be opened.

65 A movement through 90° or more can, however, prove awkward to effect in practice, particularly under difficult conditions.

An object of the present invention is to provide a safety clip for a harness with a reliable locking device which can be simply and quickly operated.

70 According to the present invention, a safety clip for a harness, comprises a body member, a gate member pivoted on the body member for movement against spring pressure between a closed position in which the two members form a closed loop and an open position in which an opening is made to allow a harness element to be introduced into or removed from the loop, and a ferrule carrying a longitudinally extended locking portion and mounted on one of the members so as to be rotatable against spring pressure from a locking position in which the locking portion prevents opening of the gate member to a position in which it permits such opening, wherein the locking portion of the ferrule and the other of said members are so shaped and dimensioned that a rotation of substantially less than one quarter turn of the ferrule is required to permit opening of the gate member. For example, a rotation of 45° has been found convenient for opening the gate member and yet to be sufficient to ensure effective locking.

Preferably the locking portion of the ferrule and the said other member have co-operating formations such that, on return movement of the gate member towards the closed position under spring pressure, engagement of the formations causes the ferrule to be rotated out of its locking position to allow the gate member to reach the fully closed position, whereupon the ferrule is allowed to spring back to the locking position.

In the preferred embodiments of the invention, the ferrule is mounted on the gate member and carries an upstanding rib forming a grip for engagement by the thumb of an operator, the locking portion of the ferrule being formed by an extended locking portion of the rib which normally lies opposite to the adjacent part of the body member so as to abut against it if opening pressure is applied to the gate member. The gate member may be formed with stops which limit the rotational movement of the ferrule, e.g. by providing abutments for the extended locking portion of the rib in its locking position and in its position in which it permits opening of the gate member. The operator can then conveniently use thumb pressure first to rotate the ferrule to unlock the gate then to open the gate member, without shifting his grip.

120 In such embodiments, the ferrule may be of substantially the same external diameter as the main part of the gate member and may be mounted on an end portion of the gate member which is reduced in diameter, a coil spring being located between the inside of the ferrule and the outside of the reduced portion of the gate member to provide the spring pressure urging the ferrule into the locking position. The co-operating formations which cause the ferrule to be rotated

to allow the gate member to close preferably comprise a surface on the adjacent end of the body member, at an angle to the relative direction of movement of the gate member, and a sloping

5 surface on the rib. With such embodiments, a movement of the ferrule of as little as 45° can suffice to permit the gate member to be opened although the locking is effective in the normal closed position and the gate member can return

10 easily to this position after being opened, due to the co-operating formations which allow the locking portion to snap past the adjacent part of the body member.

In one preferred embodiment, the ferrule is retained on the gate member by a headed plug member which forms the end of the gate member and fits into the main part of the gate member, the head of the plug having a cut-away portion which extends around a part of its periphery and

20 whose ends form the abutments for the extended locking portion of the rib on the ferrule and limit the rotational movement of the ferrule to substantially 45°. The head of the plug member preferably has an angled recess which abuts

25 against the angled surface on the adjacent end of the body member in the closed position of the gate member.

Alternatively, the ferrule may be retained on the gate member by a peg fitted tightly into the ferrule and projecting into a slot which extends around a part of the periphery of the gate member so as to restrict the movement of the ferrule to

30 substantially 45°. Specific embodiments of the invention will now be described in more detail by way of example and with reference to the accompanying drawings, in which:—

Figure 1 is an elevation of a safety clip for a harness in accordance with the invention,

40 Figure 2 is a part-sectional elevation, to a larger scale, of the engaging parts of the body member and gate member of the clip of Figure 1,

Figure 3 is an elevation of the parts of Figure 2, with the gate member approaching the closed position,

45 Figure 4 is a part-sectional view on the line IV—IV of Figure 3,

Figure 5 is an elevation of the engaging parts of the body member and gate member of an alternative design of safety clip in accordance with the invention,

50 Figure 6 is a part-sectional elevation of the parts of Figure 5, seen from the left side of Figure 5, and

55 Figure 7 is a section on the line VII—VII of Figure 5, showing in chain lines the outline of the ferrule as the gate member approaches the closed position.

In the embodiments illustrated, the clip comprises a body member 10 with an eye 11, by which it can be attached for example to the harness of the wearer, and a gate member 12 pivoted at 13 on the body member and urged by a spring (not shown) incorporated in the pivot 13

65 into the closed position, as shown, in which the

members 10 and 12 form a closed loop. By pivoting the gate member 12 inward against the spring, an opening is made between the top of the gate member and the adjacent part of the body

70 member to allow another harness element, such as a shackle on a life line, to be introduced into the loop. To prevent accidental opening of the clip, the gate member 12 is provided with a ferrule 14 formed with a longitudinal rib 15

75 having an extended locking portion 16 which normally lies opposite to the adjacent part 17 of the body member 10 so as to abut against it if opening pressure is applied to the gate member 12.

80 To enable the gate member 12 to be opened when desired, by a quick and easy operation, the ferrule 14 is rotatable about the axis of the gate member 12 through a maximum of 45° so that the locking portion 16 can slide past the part 17 of the body member 10. A coil spring 18 is stressed in torsion to return the ferrule 14 to the normal or locking position.

Referring to Figures 1 to 4, in this embodiment the ferrule 14 is mounted on a reduced diameter end portion 19 of the gate member 12, being supported at its lower end on a shoulder 20. A headed plug member 21 is tightly fitted into a bore 22 in the reduced portion 19. The head 23 of the plug member 21 has a shoulder 24 which supports the top of the ferrule 14. The plug member 21 is located against rotation in the bore 22 by a key 25 fitting into a slot in the end of the reduced portion 19. The coil spring 18 has its upper end 26 trapped in the same slot by the key 25 while its lower end 27 is received in a slot 28 in the end of the ferrule 14, so that rotation of the ferrule 14 stresses the spring 18 in torsion. As shown in Figure 4, the lower part of the locking portion 16 on the end of the rib 15 of the ferrule engages in an arcuate cut-away 29 extending around a part of the periphery of the head 23, whose ends limit the rotation of the ferrule to a maximum of 45° though a rotation of substantially less than this is needed to permit the gate member 12 to be opened, as explained below.

110 To enable the gate member 12 to return from the open position to the fully closed position without requiring the operator to rotate the ferrule 14, the part 17 of the body member 10 and the rib 15 are provided with co-operating formations as shown most clearly in Figure 4. The part 17 forms a projection having a surface 30 at an angle to the direction of approach of the rib 15 which has a sloping side 31 engageable therewith. The effect of such engagement under the pressure of the spring in the pivot 13 is to rotate the ferrule 14 clockwise (as seen in Figure 4) and thus to allow the locking portion 16 to slide past the part 17 until the fully closed position is reached. In this position the surface 30 abuts against a correspondingly angled surface 32 of a recess 33 in the head 23 to prevent further outward movement of the gate member 12. The locking portion 16 having slid past the part 17, the spring

18 is able to return the ferrule 14 to the locking position shown in Figures 1 and 2. It will be seen from Figure 4 that the angled rotation of the ferrule 14 required to permit the locking portion 16 to clear the part 17 of the body member, both on opening and closing of the gate member 12 is approximately 45°.

The embodiment of the invention shown in Figures 5 to 7 differs from that shown in Figures 1 to 4 in details of construction but is similar in concept and operation. The reduced portion 19 of the gate member 12 ends in this case in a fork 34 carrying a transverse pin 35. The part 17 of the body member 10 is a projection of reduced thickness and has a slot 36 which receives the pin 35 in the fully closed position so as to prevent further outward movement of the gate member 12. The part 17 has a surface 37 (Figure 7) at an angle to the direction of approach of the rib 15 to co-operate with it for rotating the ferrule 14 on closing the clip. The ferrule 14 is located on the reduced portion 19 by a peg 38 tightly fitted in the ferrule and engaging in a slot 39 which extends around a part of the periphery of the reduced portion 19. The ends of this slot 39 provide abutments which limit rotation of the ferrule 14 to a maximum of 45°. The upper end 40 of spring 18 is fitted into a recess in the ferrule while the lower end 41 fits into a recess in the gate member 12. As in the previously described embodiment, a rotation of the ferrule 14 through substantially less than a quarter turn, e.g. through 45°, is sufficient to permit the gate member 12 to be opened.

In both embodiments, the clip can be simply and quickly opened by rotating the ferrule 14 through approximately 45° with the thumb while pressing the gate member 12 inwards. On releasing the gate member, it springs back to the fully closed position, the ferrule 14 being automatically rotated to allow the locking portion 16 to slide past the part 17.

#### Claims

1. A safety clip for a harness, comprising a body member, a gate member pivoted on the body member for movement against spring pressure between a closed position in which the two members form a closed loop and an open position in which an opening is made to allow a harness element to be introduced into or removed from the loop, and a ferrule carrying a longitudinally extended locking portion and mounted on one of the members so as to be rotatable against spring pressure from a locking position in which the locking portion prevents opening of the gate member to a position in which it permits such opening, wherein the locking portion of the ferrule and the other of said members are so shaped and dimensioned that a rotation of substantially less than one quarter turn of the ferrule is required to permit opening of the gate member.

2. A safety clip according to Claim 1 wherein a rotation of substantially 45° is required to permit

opening of the gate member.

3. A safety clip according to Claim 1 or 2 wherein the locking portion of the ferrule and the said other member have co-operating formations such that, on return movement of the gate member towards the closed position under spring pressure, engagement of the formations cause the ferrule to be rotated out of its locking position to allow the gate member to reach the fully closed position, whereupon the ferrule is allowed to spring back to the locking position.

4. A safety clip according to any one of the preceding Claims wherein the ferrule is mounted on the gate member and carries an upstanding rib forming a grip for engagement by the thumb of an operator, the locking portion of the ferrule being formed by an extended locking portion of the rib which normally lies opposite to the adjacent part of the body so as to abut against it if opening pressure is applied to the gate member.

5. A safety clip according to Claim 4 wherein the ferrule is of substantially the same external diameter as the main part of the gate member and is mounted on an end portion of the gate member which is reduced in diameter, a coil spring being located between the inside of the ferrule and the outside of the reduced portion of the gate member to provide the spring pressure urging the ferrule into the locking position.

6. A safety clip according to Claim 4 or 5 as appendant to Claim 3 wherein the co-operating formations which cause the ferrule to be rotated to allow the gate member to close comprise a surface on the adjacent end of the body member, at an angle to the relative direction of movement of the gate member, and a sloping surface on the rib.

7. A safety clip according to any one of Claims 4 to 6 wherein the gate member is formed with stops which limit the rotational movement of the ferrule.

8. A safety clip according to Claim 7 wherein the stops provide abutments for the extended locking portion of the rib in its locking position, and in its position in which it permits opening of the gate member.

9. A safety clip according to Claim 8 wherein the ferrule is retained on the gate member by a headed plug member which forms the end of the gate member and fits into the main part of the gate member, the head of the plug having a cut-away portion which extends around a part of its periphery and whose ends form the abutments for the extended locking portion of the rib on the ferrule and limit the rotational movement of the ferrule to substantially 45°.

10. A safety clip according to Claim 6 or any one of Claims 7 to 9 as appendant to Claim 6, wherein the head of the plug member has an angled recess which abuts against the angled surface on the adjacent end of the body member in the closed position of the gate member.

11. A safety clip according to any one of Claims 4 to 7 wherein the ferrule is retained on the gate member by a peg fitted tightly into the

ferrule and projecting into a slot which extends around a part of the periphery of the gate member

so as to restrict the movement of the ferrule to substantially one quarter turn.

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